REMARKS

Claims 1, 3, 4, 6-8, 10-14, 16 and 20-29 remain pending in the application, with claims 1, 4, 7, 11 and 14 being the independent claims. Reconsideration and further examination are respectfully requested.

Initially, Applicant thanks the Examiner for the indication that claims 7, 8, 10 and 27 are allowed.

In the Office Action, claims 1, 4, 14, 16, 20-22, 24-26 and 29 were rejected under 35 USC § 102(b) over U.S. patent 5,038,215 (Hadfield); claims 11, 12 and 28 were rejected under § 102(b) over Japanese patent JP406022007 (Tanaka); claims 3 and 6 were rejected under § 103(a) over Hadfield; claim 23 was rejected under § 103(a) over Hadfield in view of Tanaka; and claim 13 was rejected under § 103(a) over Tanaka. Withdrawal of these rejections is respectfully requested for the following reasons.

With regard to the rejection of independent claims 1 and 4, the Office Action asserts that Hadfield discloses a digital circuit (referencing elements 53 and 58) that is located proximate to the first circuit (referencing element 51) and to the second circuit (referencing element 52). However, nothing in Hadfield indicates that his readout register 53 or his dummy readout register 58 is a digital circuit. To the contrary, all indications are that readout registers 53 and 58 are in fact analog circuits.

Specifically, as shown in Figure 5B of Hadfield, the output of CCD imaging array 57 is directly input into each of readout register 53 and readout registered 58. Clearly, the signals output from the CCD imaging array 57 are analog. Therefore, it must be concluded that the signals stored within registers 53 and 58 also must be analog. Accordingly, registers 53 and 58 themselves are analog devices.

This conclusion is further supported by the descriptions of registers 53 and 58 in Hadfield. In this regard, Hadfield describes registers 53 and 58 as shift registers for shifting the electrical charges that are produced by imaging array 57. See, e.g., column 2 lines 61-63; column 3 lines 4-9. As discussed below, this conforms to the conventional operation of a combination CCD and shift register. Once again, nothing in Hadfield suggests the shift registers 53 and 58 are digital devices, and there does not appear to be any reference to digital data anywhere in Hadfield.

Still further, the outputs of registers 53 and 58 clearly are analog signals. For example, column 4 lines 43-48 notes that the registers' outputs are amplified in charge sense amplifiers 51 and 52 and then are applied to a differential amplifier 55, which subtracts such outputs. Clearly, these operations only could be applied to analog signals.

Thus, there can be no doubt that Hadfield's shift register's 53 and 58 are used for shifting analog charges corresponding to the pixel signals generated by CCD array 57. The foregoing description also is consistent with other conventional implementations of CCDs. That is, a conventional CCD consists of an array of light-sensitive semiconductor elements that simultaneously are exposed to light. The result is an array of electrical charges, each being proportionate to the amount of light exposure. Those charges then are transferred to a readout (or shift) register, which shifts the charges out in a serial stream for processing.

Independent claims 1 and 4 have been amended above to clarify that the digital circuit processes data values in discrete, as opposed to continuous, quantities. This is simply the conventional definition of "digital", as indicated in the Web page printout

attached as Appendix A to this Response. Based on the preceding discussion and this definition, Hadfield clearly does not disclose that either of his readout registers 53 or 58 is a digital circuit, as presently recited.

Lacking this feature of the invention, Hadfield could not be said to have anticipated independent claims 1 or 4. Accordingly, those claims are believed to be allowable over the applied art.

Independent claim 11 recites, among other things, a plurality of analog circuits that produce output signals, a noise separator circuit that produces a noise signal, and a noise canceling circuit that processes the output signals of the analog circuits with the noise signal (i.e., the output of the noise separator circuit) to reduce the noise component of the analog circuits' output signals. The Office Action asserts that the recited analog circuits read on Tanaka's microphones 5 and 9, the recited noise separator circuit reads on Tanaka's analog-to-digital converters 12 and 13, and the recited noise canceling circuit reads on Tanaka's digital signal processor 11.

However, the Office Action then asserts that Tanaka's digital signal processor 11 processes the output of the microphones 5 and 9 together with the output of his analog-to-digital converters 12 and 13 in order to reduce the noise component of the output signals for microphones 5 and 9. Clearly, this is not the case.

Rather, Tanaka's digital signal processor 11 only appears to process the output of his analog-to-digital converters 12 and 13. In fact, it likely would not be possible for Tanaka's digital signal processor 11 to process the microphone output signals, as those signals clearly are analog signals, and Tanaka's digital signal processor 11 apparently is

only capable of processing digital signals. As a result, this feature of the invention could not possibly have been disclosed by Tanaka.

Lacking this feature of the invention, Tanaka could not have anticipated independent claim 11. Accordingly, claim 11 is believed to be allowable over the applied art.

Independent claim 14 recites the feature that a signal is supplied to the second circuit which results in a null output from the second circuit. This feature of the invention does not appear to be disclosed by Hadfield. In fact, the Office Action does not even allege that charge sense amplifier 52 (on which the Office Action asserts the recited "second circuit" reads) is supplied with a signal that results in a null output. No such argument could be made, as the input to charge sense amplifier 52 is provided by dummy readout register 58.

Based on the foregoing remarks, independent claim 14 also could not have been anticipated by Hadfield. Accordingly, claim 14 is believed to be allowable over the applied art.

In order to sufficiently distinguish Applicant's invention from the applied art, the foregoing remarks emphasize several of the differences between the applied art and Applicant's invention. However, no attempt has been made to categorize each unobvious difference. Applicant's invention comprises all of the elements and all of the interrelationships between those elements recited in the claims. It is believed that for each claim the combination of such elements and interrelationships is not disclosed, taught or suggested by the applied art. It is therefore believed that all claims in the application are fully in condition for allowance, and an indication to that effect is

respectfully requested. The other claims in the application depend from the independent claims discussed above and are therefore believed to be allowable for at least the same reasons. In addition, each such dependent claim recites an additional feature of the invention that further distinguishes the invention from the applied art. Accordingly, the individual reconsideration of each on its own merits is respectfully requested.

In view of the foregoing remarks, all claims in the application are now believed to be in condition for allowance, and an indication to that effect is respectfully requested.

If there are any fees due in connection with the filing of this paper that have not been accounted for in this paper or the accompanying papers, please charge the fees to Deposit Account No. 12-2252. If an extension of time under 37 C.F.R. 1.136 is required for the filing of this paper and is not accounted for in this paper or the accompanying papers, such an extension is requested and the fee (or any underpayment thereof) should also be charged to Deposit Account No. 12-2252. A duplicate copy of this page is enclosed for that purpose.

Respectfully submitted,

MITCHELL, SILBERBERG & KNUPP LLP

Dated: July 27, 2004

By ______________________
Joseph G. Swan
Registration No. 41,338

MITCHELL, SILBERBERG & KNUPP LLP
11377 West Olympic Boulevard
Los Angeles, California 90064
Telephone: (310) 312-2000
Facsimile: (310) 312-3100

MENU
Home
Term of the Day
New Terms
New Links
Quick Reference
Did You Know?
Search Tool
Tech Support
Webopedia Jobs
About Us
Link to Us
Advertising

Compare Prices: go

HardwareCentral

Talk To Us...
Submit a URL
Suggest a Term
Report an Error

Developer
Downloads
International
Internet Lists
Internet News

digital

Last modified: Tuesday, May 25, 2004

(adj.) Describes any system based on discontinuous data or events. Computers are digital machines because at their most basic level they can distinguish between just two values, 0 and 1, or off and on. There is no simple way to represent all the values in between, such as 0.25. All data that a computer processes must be encoded digitally, as a series of zeroes and ones.

The opposite of digital is *analog*. A typical analog device is a clock in which the hands move continuously around the face. Such a clock is capable of indicating every possible time of day. In contrast, a digital clock is capable of representing only a finite number of times (every tenth of a second, for example).

In general, humans experience the world analogically. Vision, for example, is an analog experience because we perceive infinitely smooth gradations of shapes and colors. Most analog events, however, can be simulated digitally. Photographs in newspapers, for instance, consist of an array of dots that are either black or white. From afar, the viewer does not see the dots (the digital form), but only lines and shading, which appear to be continuous. Although digital representations are approximations of analog events, they are useful because they are relatively easy to store and manipulate electronically. The trick is in converting from analog to digital, and back again.

This is the principle behind compact discs (CDs). The music itself exists in an analog form, as waves in the air, but these sounds are then translated into a digital form that is encoded onto the disk. When you play a compact disc, the CD player reads the digital data, translates it back into its original analog form, and sends it to the amplifier and eventually the speakers.

Internally, computers are digital because they consist of discrete units called bits that are either on or off. But by combining many bits in complex ways, computers simulate analog events. In one sense, this is what computer science is all about.

Also see *quantum computing*.

•**E-mail this definition to a colleague**•

Related Categories

Internet Resources
IT
Linux/Open Source
Small Business
Windows Technology
Wireless Internet
xSP Resources

Search internet.com
Advertise
Corporate Info
Newsletters
Tech Jobs
E-mail Offers

internet commerce
Be a Commerce Partner
Tech Magazines - FREE

*For internet.com pages about **digital** CLICK HERE. Also check out the following links!*

LINKS = *Great Page!*

Digital compression techniques - article

Describes the future of digital compression, techniques and picture quality.

Roots of the Processor: Digital Logic and the Semiconductor

Describes the fundamentals of how digital logic and circuits work. This page is from "The PC Guide".

Computer Science

Data

Related Terms

analog

bug

DAC

digital_audio

digitize

modem

Nyquist's Law

transducer

(Webopedia)
Give Us Your Feedback